THEORETICAL AND METHODICAL ESSENCE OF TECHNOLOGY TRANSFER ON THE BASIS OF ENTREPRENRY AND INTRAPRENEURSHIP

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ANNOTATION

In the article it is proved that a considerable part of scientific developments of industrial enterprises, in most cases quite effective and promising, remain unclaimed; high, and in most cases inaccessible even to the technological product development companies themselves. their commercialization (transfer) costs are not high enough, and in most cases not accessible even to the technological product development companies themselves. The conceptual and categorical apparatus of technology transfer has been clarified. It is proved that transfer of technologies developed at machine-building enterprises can be carried out mainly with the use of two entrepreneurial institutions: entrepreneurship (external transfer) and intrapreneurship (intra-firm transfer). Possible organizational and economic forms of the end result have been formed when used in machine-building enterprises of entreprenry and intrapreneurship. The basic prerequisites for the formation and use of integrated high technologies at machine-building enterprises, which most closely meet the economic and legal criteria of the transfer process. Such prerequisites, in particular, include: increase in the scientific and technological capacity, complication of engineering products, acceleration of scientific and technological progress, introduction of intellectual development in the production, increasing the level of market competition, etc. A detailed analysis of the current state of the domestic technological market has been carried out, and the main positive and negative factors have been identified, which most or not ensure the effectiveness of its functioning. It was found that the level of financial support for innovative activity in the country (0.3-0.4% of GDP) is not able to ensure the effectiveness of scientific research. Obstacles to the effective implementation of intra-company technology transfer at machine-building enterprises are identified and generalized. These include economic, scientific, technical, social and political obstacles.

INTRODUCTION

In the conditions of intellectualization of the national economy and business development, our country urgently needs theoretical and methodological study of the problems of choosing the most expedient ways and methods of development of an industrial enterprise, taking into account specific external conditions and existing reality. One of the possible ways of the intellectual development of the enterprise is the intrapreneurship, which is an initiative, innovative activity in the production and sale of goods and services based on the integration of innovative, intellectual and entrepreneurial capabilities of the enterprise in order to effectively use the resources of the enterprise and its dynamic development based on innovations. The traditional large enterprises of Ukraine are characterized by low efficiency, which is caused by their considerable capitalism, outdated equipment, is explained by

technical, technological and organizational conservatism, low level of motivation and responsibility of the managers of the enterprise of practically all levels.
The challenges of the external environment today create an urgent need for innovative development of domestic machine-building enterprises in order to increase the level of competitiveness of their products, enter the European market, and gain leadership in their segment. Therefore, the development of endogenous mechanisms for the transfer of innovative technologies is becoming a priority in today's economic environment. The results of the study show that the efficiency of technology transfer to leading machine-building enterprises of the Poltava region (PJSC “Kredmash”, PJSC “KVBZ”, PJSC “KrKZ”, PJSC “AvtoKrAZ”) has been quite low in recent years. On this basis, it should be noted that a large part of the scientific development of industrial enterprises, in most cases quite effective and promising, remain unclaimed, the possibilities of their commercialization (transfer) are not high enough, and in most cases - inaccessible even to the technological product development companies themselves. Therefore, this aspect of the problem requires more detailed study and scientific substantiation.

ANALYSIS OF MAJOR ACHIEVEMENTS AND LITERATURE.

Technology transfer is a tool for technology dissemination and deployment. In the scientific literature, there is no single, universal interpretation of the concept of technology transfer, the methodological basis for the valuation of technological products is imperfect. Existing approaches to the interpretation of the relevant scientific and practical category are characterized by significant differences in determining the nature and forms of technology transfer. A critical analysis of the scientific literature makes it possible to outline the commonality and difference of views of domestic and foreign scientists on the formation of technology transfer methodology. The theoretical and practical issues of technology transfer at industrial technology transfer enterprises have been quite relevant in the scientific development of many scientists. Among them should be noted the scientific works of experts in the field of technology transfer such as Kocziszky G. (2017, 2018), Veres Somosi M.(2017, 2018), Pererva P.G. (2016, 2018), Sikorska M. (2016, 2017), Kobielieva T.O. (2016, 2017), Reichling P.(2017, 2018), Poberezhnyi R. (2014, 2016), Kosenko O.P. (2017, 2018), Besprozvannykh O. (2019), Romanovskyy O.O. (2012), Vlasova M.F. (2014), Aleksashkina Y.I. (2011) and others. Despite the considerable contribution of the foregoing scholars to the development of this subject, many issues remain insufficiently covered. Further research requires, first and foremost, the theoretical foundations of technology transfer management at the industrial enterprise level, since in most studies the focus is on ensuring the effectiveness of individual stages of technology transfer (selection of organizational forms of transfer, commercialization of technologies, implementation of innovative technologies). Also important is the development of possible options for carrying out transfer operations, depending on the available technical and organizational support, determining the level of their effectiveness.

OUTLINE OF THE MAIN RESEARCH MATERIAL

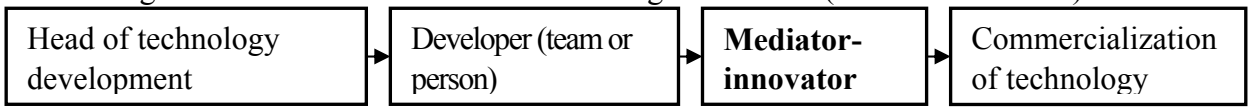
The commercialization (transfer) of new technological products, in our view, is always accompanied by two major problems that are closely linked. First, the result of the commercialization of innovative technologies is formed under conditions of high uncertainty, which causes increased risk (compared to traditional lines of business). Secondly, in the process of commercialization (transfer) of new technological products, the technology developer (licensor) has a potential consumer (licensee) deficit of available resources: even with sufficient financial resources (which is rare), the licensee is faced with the tasks of forming new channels- technical supply, recruitment with other qualifications, purchase of additional equipment, creation of a sales network, advertising and more. The scarcity of resources increases the uncertainty and risk of intellectual and innovation activity, and the increased risk is an obstacle to attracting resources to the successful implementation of the technology transfer project (Gorfinkel V.Y., 2015).

Having a higher risk of entrepreneurship in the field of innovation than traditional forms of entrepreneurship, businessmen and financiers are not always ready to invest in untested ideas, innovations in the early stages of their life cycle. As the experience of financing technology commercialization projects at the stage of innovation lifecycle growth brings profitability, many times higher than the usual market return of financial investments. Thus, the authorized capital of the Japanese company Sony at the time of its foundation in 1946 was only $ 500. USA. Sony is now a multi-sector multinational, multi-billion dollar market cap. For 50 years, the return on initial investment exceeded 100% per annum, while the average market rate of return on financial investment for the same period ranged from 5-25%. B. Gates, the founder of Microsoft, acquired the rights to DOS (the first version of the operating system for an IBM personal computer) for only $ 50,000. The United States, which ultimately made it one of the richest entrepreneurs on the planet (Gorfinkel VY, 2015). Thus, the main features of innovative entrepreneurship, which underlies the transfer (commercialization) of technology, are, on the one hand, high risk, and on the other - high return on investment.

Drawing on foreign and domestic experience of technological transfer, we analyze the problems of technological entrepreneurship and relationships between the developer of the technological product, the entrepreneur, the head of the organization-developer of technology (manager). Interaction patterns can and should be modified and developed to reflect those trends that emerged at the end of the 20th century, as well as new methods of scientific research.

In the classical organizational scheme of technological transfer, the head of the development organization at the initial stage deals with the technology developer and, after a certain signal on his part about the readiness of the technology for consumption, tries to find an effective form of commercialization with the use of certain institutions (Fig.1). At the same time, we do not exclude from the consideration of such an option, when as such an institution will be a direct technology developer (the developer started his own business or led the development of new products using his own development in his enterprise).

Figure 1 - The classic scheme of technological transfer (commercialization)



The core of the scheme (Fig. 1) is the institution of the mediator-innovator, which may have fundamentally different goals, forms and methods of bringing the technological product to practical use. In principle, there are two main types of intermediary innovators:

a) Intermediary-innovator focused on the external consumption of technology, ie the use of a technological product under certain conditions (license, sharing, complete alienation) in another enterprise;

b) Intermediary-innovator focused on in-house consumption of technology, ie the use of a technological product at one's own enterprise for the purpose of improving individual links of production and commercial activity (product, technological equipment, marketing or management technologies, etc.)

At the same time, organizational schemes of technological transfer are slightly changing, as the methodological essence of these types of intermediaries-innovators is fundamentally different.

Our research shows that most often domestic innovative technological transfer projects are oriented towards the external consumer, translating to him the possibility of success or failure of the transfer procedure. This type of entrepreneurial activity is called entrepreneurship or entrepreneurial activity.

Entrepreneurship is a type of entrepreneurial activity associated with the search for potentially commercialized and cost-effective technologies, the organization of their financing and the introduction at the early stages of the life cycle, profit from an effective market monopoly (Slovar, 2019). Often, entrepreneurs are creating small innovative businesses or financing innovative development without any explicit purpose, acting as business angels. With good intuition and strategic vision for the industry, they often successfully predict technological changes and prepare for them in advance. For example, in 1976, Commodore, the manufacturer of one of the first personal computers, acquired the small company MOS Technology, the main product of which was the 6502 processor. MOS Technology was on the verge of ruin: the PC manufacturing center moved to the Southeast Asia, where cheap labor has provided a competitive edge to electronic components manufactured. Buying a loss-making firm, Commodore's manager did not have a clear idea of its capabilities: at first, it provided part of the internal production needs of processors and conducted research in the field of microelectronics. One of Commodore's main competitors in the PC market was Texas Instruments, which launched the Atari 800 computer in 1981, which first offered a technical solution to enhance PC graphics capabilities - a special graphics card that complements the microprocessor. MOS Technology has begun to develop and release its own innovative product - a video and sound card, which can significantly improve the performance and visual-acoustic capabilities of the VIC-20 base computer. Having not only a research center but also its own manufacturing base, MOS Technology quickly achieved its goal (within nine months), and in 1983 Commodore won a convincing market victory: Texas Instruments gave up competition (Gorfinkel V.Y., 2015) .

The term "entrepreneur" in translation is associated with the concept of "mediator", although in its essence means "entrepreneur", and entrepreneurial ("entrepreneurship") with the concept of "mediation", although correct is "entrepreneurship" (Romanovskyy O.O., 2012). With regard to the task of technology transfer, an entrepreneur is, in essence, the one who initiates (gives an initial impulse, gives birth) entrepreneurship (business, business) related to this technology. At the same time, potential entrepreneurs find outside the enterprise-technology developer or (as a possible option) he himself starts a new own business, which is based on this technological product. However, the resources of the developer are usually not used, it can only be about providing technological, organizational, marketing or other professional assistance. An entrepreneur may be an employee of a technology developer or may not be one. In both cases, he mostly fulfills an intermediary mission (except for the use of technology in his own business), which is inherent in entrepreneurship (Fig.2).

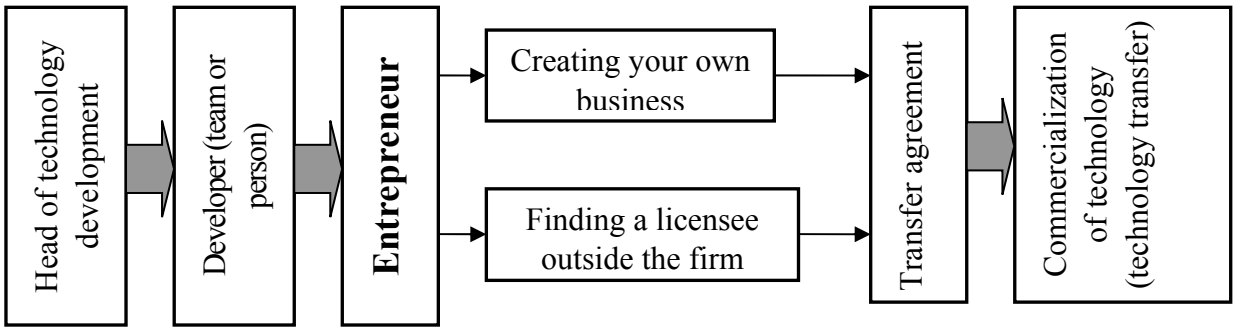


Figure 2 - Scheme of technological transfer (commercialization) of a technological product using the services of an entreprener

Entrepreneurs tend to use more aggressive competitive strategies, using unexpected technical, organizational and management decisions. The successful entrepreneur's activity is always accompanied by extraordinary organizational and managerial innovations.

Despite gaining commercial success in the early stages of the technological product lifecycle, entrepreneurs are far from always effective entrepreneurs in the later stages of the technological innovation lifecycle. Even if the company is successful in business, under stable production conditions, they are not always able to find rational solutions. Many of them are not able to overcome the "growth pains" when the growth of staff, the size of the growing market requires changes in enterprise strategy, new approaches and management methods. All this contributes to the fact that the potential commercial opportunities for technology transfer are not always fully exploited. As we noted above, the use of potential capabilities of intra-company technology transfer is at a rather low level.

One of the ways to increase the efficiency of technology transfer can be the allocation of special industries-intrapreneurs, that is, enterprises and their respective units (scientific, technological, design, technical, organizational) capable of producing innovative, intellectually rich, competitive products.

At the same time, our research shows that at this time in the industry of our country there is a constant tendency to misunderstand the benefits and effectiveness of intra-industrial activities. Moreover, the higher the managerial level of management, the more pronounced this tendency. Being a relatively new area of research and production, intrapreneurship is an attractive field of scientific research, since the state of scientific knowledge in this subject area is poorly structured, the synthetic nature of the phenomenon leads to the coexistence of a large number of approaches to its definition and study. All of the above indicates that there is an urgent need to understand and study the nature and role of intrapreneurship for the Ukrainian economy in order to apply it in the practical activity of domestic enterprises. Therefore, theoretical and applied research is now focusing not only on entrepreneurship as one of the effective ways of doing things on a stand-alone basis, but also entrepreneurship in unity with the strategy of intra-firm or intra-firm entrepreneurship related to intra-firm implementation (transfer) and the independent use of intellectual development (technology, innovation, intellectual property) of a particular enterprise.

The scheme of technological transfer at own consumption of technological product (intra-company transfer) looks a bit different (Fig. 3).

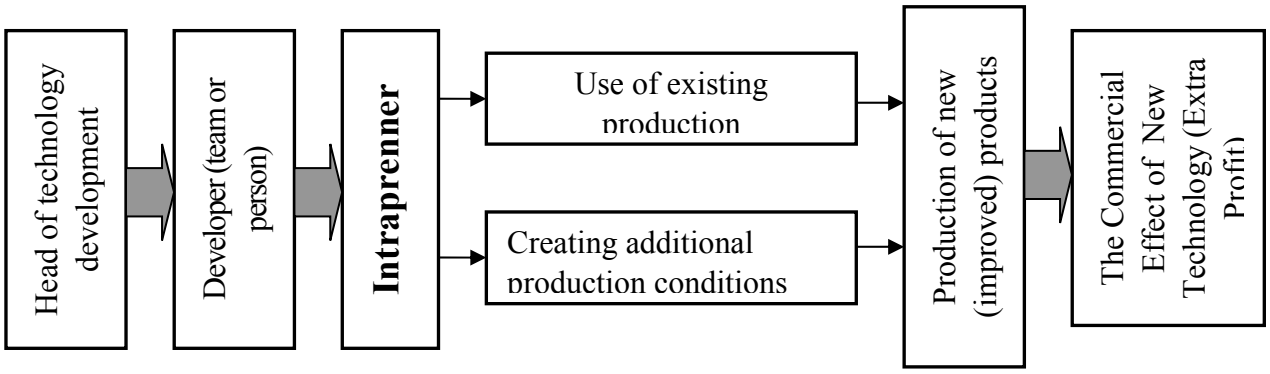


Figure 3 - Scheme of technological transfer (commercialization) of a technological product using the services of an intrapreneurs

Intrapreneurship involves the utilization of the creative potential of employees of all divisions of an industrial enterprise (not only the divisions of innovative direction), therefore, the key figure is an intrapreneur. An intrapreneurs is an employee of a given company who works for hire, shows creative initiative, differs in a special spirit of entrepreneurship, generates new ideas, organizes business in such a way that the enterprise makes a profit through the effective use of its own intellectual and material and technical resources. As Aleksashkina Y.I. (2011), the entroprener possesses micropolitical abilities in the implementation of his entrepreneurial activity within the framework of a formed, operating enterprise. Thus, it is an "economic man" who has the status, education, has sound ambitions to realize his ideas, avoiding and resolving intra-firm conflicts. An intrapreneur (in-house entrepreneur) at a given enterprise can be a manager, a specialist, a worker, that is, to perform their functions in accordance with the workplace. At the same time, only the personality possessing certain entrepreneurial abilities can be an intrapreneur. Testing allows them to identify such important entrepreneurial qualities as: risk aversion, creativity, commitment to the goal, ability to make business plans, skills in law, economics and finance, etc. Therefore, from all of the above, one can distinguish one of the main characteristics of an intrapreneur - is the motivation of entrepreneurial activity as a motivation for a particular type of work. The fact that the development and implementation of product and technological innovations, that is, the

intellectual component of its activity, and therefore of the entire collective of the enterprise, is extremely important.

The foreign experience of the countries shows that it is the small innovative enterprises (interpreners) that are the link that links science and industry. They are ready to take the risk of turning the idea of creating prototype products into real products. Without this, it is impossible to assess how promising this market will be for this scientific development and should be engaged in its commercialization (entrepreneurial activity). It is because of the presence of innovative risk at this stage that many large companies do not make large-scale investment because they need at least some guarantee of success. That is, in practice, the implementation of scientific research has become a niche of small innovative firms, which has become possible with the development of intrapreneurship on the one hand, and entrepreneurship - on the other.

The emergence of increased interest in the Ukrainian industry for intrapreneurship, in our opinion, is due primarily to socio-economic trends in the post-Soviet space, the need for the transition of production structures to the entrepreneurial form of production organization. Most of the machine-building enterprises in the Ukrainian economy face such problems as inertia of the organization in the changing environment, outdated technologies, resistance to innovation, low competitiveness of products and services, significant turnover of staff, lack of motivation of employees to work effectively. The same problems are common in other countries of the former Soviet Union (Vlasova M.F., 2014).

However, as our studies indicate, there is every reason for the active use of theoretical and methodological and practical principles of intrapreneurship in machine-building enterprises of our country, and, it seems to us, not only for the needs of intra-company technology transfer. In particular, in our opinion, intrapreneurship can find its fertile ground in the conditions of incomplete utilization of production capacities of enterprises, that is, when senior management will be pleased to accept the proposals of intrapreneurs for additional production load, to increase the total production at the same production capacity. Especially if these proposals are related to the introduction of advanced technologies, innovative findings, creative developments, which generally characterize the processes of intra-company technology transfer.

In this regard, in our opinion, there are interesting data obtained by us at the machine-building enterprises of the Kremenchug industrial region (Table 1.1), which testify to their wide production and entrepreneurial reserves, which should be actively used to accelerate the pace of scientific and technological progress using internally - corporate entrepreneurship.

Table 1 - Opportunities of machine-building enterprises of the Kremenchug industrial region for introduction of intrapreneurship

Year of analysis	Enterprises of the Kremenchug industrial region				
	PJSC «Kredmash»	PJSC «KVBZ»	PJSC «KrKZ»	PJSC «AvtoKrAZ»	PJSC «Promsantehnika»
Average capacity utilization rate, %%					
2016	67	76	62	43	68
2017	73	79	58	39	71
2018	65	81	65	44	64
Cost of scientific and technological development (%% of total cost)					
2016	1,32	2,74	1,53	0,84	0,11
2017	0,81	2,42	1,28	0,52	0,24
2018	1,13	2,67	1,32	1,05	0,17
State of internal implementation of own technological developments (%% by number)					
2016	20,0	25,0	33,4	28,6	0
2017	0,0	10,0	0	18,75	50,0
2018	16,7	33,4	25,0	30,0	0
External implementation state of own technological developments (%% by number)					
2016	20,0	37,5	0	14,3	50,0
2017	25,0	20	0	25,00	0
2018	33,4	24,9	25,0	20,0	0

The data in table 1 show that, by spending some money on the creation of scientific and technological developments, machine-building enterprises do not bring practically most of their creative developments to implementation, to practical use. One can understand in some way the state of affairs at PJSC “Promsantehnika”, a small machine-building enterprise in Gorishni Plavni, which spends only 0,1..0,2 percent of the funds on scientific development and practically does not find the scope (or opportunity) to use its own developments as in itself and other businesses. But it is difficult to find an explanation for the fact that such a large car company as PJSC “AvtoKrAZ”, spending about one percent of the funds on the creation of new technological products, also translates most scientific developments into a state of “future periods”. However, at this enterprise, the opportunities for increasing production volumes with the use of new technological products are greatest among the enterprises under analysis. For example, in 2014, PJSC PJSC AvtoKrAZ developed 16 technological products, of which only three technologies were used at their own enterprise (18.75%), and four technologies (25.0%) were commercialized at other enterprises.

The situation is not much better at the Kremenchug Road Machine Plant (PJSC "Kredmash") and the Kremenchug Wheel Plant (PJSC "KrKZ"), where an average of 4-6 technological products are developed during the year, but less than half of them are commercialized. And the possibility of increasing the utilization of production capacities (that is, the possibility of developing intrapreneurship) is also quite significant (up to 40 percent).
The Kremenchug Wagon Plant (PJSC "KVBZ"), which pays much more attention to scientific development (funding at 2 ... 3 percent) and the percentage of technology commercialization is much higher than 50% (to a certain extent, at the background of other enterprises, is observed at the Kremenchug Wagon Factory). as an exception should be considered 2014, when the company underwent some restructuring). However, at this enterprise, as shown in Table 1, there are significant reserves of both internal and external technology transfer, that is, the development of both intrapreneurship and entrepreneurship.
We pay special attention to the fact that within the enterprise, intrapreneurship will create conditions for more efficient use of the enterprise resources. The competent use of resource reserves is a particularly urgent problem in times of crisis in the Ukrainian economy, as their large surpluses appear. To a large extent, this is characteristic of machine-building enterprises, which is confirmed by the data in Table 1. In particular, these are simple technological equipment, part-time work for employees of the enterprise, large amounts of unused inventory. Implementation of intrapreneurship will allow to download the released resources, reduce social tensions, to preserve the labor resources of the enterprise, especially highly professional personnel, which form the basis of this enterprise. In addition, intrapreneurship will allow to use illiquid material resources, the volume of which, according to statistics, is up to 20% of the total amount of consumed material resources (Vlasova M.F., 2014). This is achieved through the freedom of the intra-industrial operator to dispose of available resources while introducing new technological products into production.

CONCLUSIONS.

The results of the study allow us to draw the following general conclusions and recommendations.

1. In accordance with the object of the research, namely the processes of providing intra-firm technology transfer at machine-building enterprises and the presence of significant differences in scientific views regarding their essence, clarification of the conceptual and categorical apparatus of technology transfer.

2. It is proved that the transfer of technologies developed at machine-building enterprises can be carried out mainly with the use of two entrepreneurial institutions: entrepreneurship (external transfer) and intra-transfer (intra-firm transfer). Possible organizational and economic forms of the end result have been formed when used in machine-building enterprises of entreprenry and intrapreneurship.

3. The basic prerequisites for the formation and use of integrated high technologies at machine-building enterprises, which most closely meet the economic and legal criteria of the transfer process, are identified. Such prerequisites, in particular, include: increase in the scientific and technological capacity, complication of engineering products, acceleration of scientific and technological progress, introduction of intellectual development in the production, increasing the level of market competition, etc.

4. A detailed analysis of the current state of the domestic technological market has been carried out and the main positive and negative factors that most or not ensure the efficiency of its functioning have been identified.

5. It is found that the level of financial support for innovative activity in the country (0.3-0.4% of GDP) is not able to ensure the effectiveness of research. With such funding, science is not only able to carry out economic (the minimum value of the percentage of funding for this function of science is at the level of 0.9%), but also the cognitive function, limited only to socio-cultural tasks.

6. It is determined that the machine-building industry of Ukraine is characterized by an inefficient structure (97% of the industry belongs to the third and fourth technological structures), which also affects the structure and geography of economic relations. At the same time, the processes of technological renewal of the industry are observed, and the number of innovative enterprises is increasing, which is caused by the exhaustion of the traditional ways of profit.

7. It is proved that engineering enterprises, provided that the mechanism of scientific and technical cooperation and access to financial resources are improved, have the potential to move from copying and purchasing technology to developing their own innovative technological products.

8. In order to increase the efficiency of intra-firm technology transfer, the necessity of using an intra-firm technological enterprise (intrapreneurship) is substantiated.

9. The obstacles to the effective carrying out of intra-company technology transfer at machine-building enterprises are identified and generalized. These include economic, scientific, technical, social and political obstacles.

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